



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,839	03/30/2004	Lalit M. Bharadwaj	U 015121-7	3629

140 7590 09/19/2007
LADAS & PARRY
26 WEST 61ST STREET
NEW YORK, NY 10023

EXAMINER

LIN, JERRY

ART UNIT	PAPER NUMBER
----------	--------------

1631

MAIL DATE	DELIVERY MODE
-----------	---------------

09/19/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/812,839	Applicant(s) BHARADWAJ ET AL.	
	Examiner Jerry Lin	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5,11,13,17,19 and 22-32 is/are pending in the application.
- 4a) Of the above claim(s) 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,11,13,17 and 22-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants' arguments, filed June 18, 2007, have been fully considered and they are deemed to be persuasive. However, in light of the amendments, the following rejections are newly applied. They constitute the complete set presently being applied to the instant application.

Status of the Claims

Claims 1, 2, 4, 5, 11, 13, 17, 22-32 are under examination.

Claims 3, 6-10, 12, 14-16, 18, 20, and 21 are cancelled.

Claim 19 is withdrawn as being drawn to a non-elected group.

Sequence Rules Compliance

2. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). Such sequence is present in the specification on pages 4-13 and on Figures 4 and 5. However, this application fails to comply with the requirements of 37 CFR 1.821 through 1.825 because these sequences are not followed by a sequence identifier (SEQ ID NO:X). Applicants are given the same response time regarding this failure to comply as that set forth to respond to this office action. Applicants are reminded that it is required that SEQ ID Nos be amended into the specification at each sequence, and that when a sequence is presented in a drawing regardless of the format or the manner of presentation of that sequence in the drawing, the sequence must still

Art Unit: 1631

be included in the Sequence Listing and the sequence identifier ("SEQ ID NO:X") must be used, either in the drawing or in the Brief Description of the Drawings. Failure to comply with these requirements may result in ABANDONMENT of the application under 37 CFR 1.821(g).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 2, 4, 5, 11, 13, 17, 22-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 22, the instant claims recites "storing the DNA molecule with a storage DNA." It is noted that storage DNA was previously defined in claim 1 as "a mixture of hemogenous/heterogenous DNA." However, in the present set of claims, this definition has been deleted. The specification does not define this term. A review of the prior art has not revealed any commonly accepted definition. Thus, it is unclear what makes DNA a "storage" DNA.

This rejection was necessitated by amendment.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1631

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 2, 4, 5, 11, 13, 17, 22, 26, 27, and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bancroft et al. (US 6,312,911) in view of Ackley (US 6,422,476).

The instant claims are drawn to a method of encoding information in DNA by producing a synthetic DNA molecule with encrypted information that can be decoded with an encryption key, where the molecule is flanked on each side by a primer sequence, and storing the DNA molecule with a storage DNA.

Regarding claims 1, 5, 22, 26, 27, and 30, Bancroft et al. teach a method that includes providing an encryption key (Figure 1B); producing a synthetic DNA molecule with encrypted information that can be decoded with an encryption key, where the molecule is flanked on each side by a primer sequence (column 2, lines 34-54; column 4, lines 55-67); and storing the DNA molecule with storage DNA (column 2, lines 34-54),

Art Unit: 1631

and producing a plurality of synthetic DNA molecules that each encode a different portion of the message (column 4, lines 45-54; column 6, lines 30-42).

Although, Bancroft et al. teaches using all four nucleotides in three base codes to represent ASCII characters (column 4, lines 55-67), Bancroft et al. do not explicitly teach providing an encryption key where each character of an extended ASCII character is represented by a DNA code of four bases.

Also regarding claims 1, 5, 22, 26, 27, and 30, Ackley teaches that using a longer code allows a user to represent more characters with a code (columns 1 and 2). Thus, one of ordinary skill in the art would increase the number of nucleotides in a base code to gain the capability to represent more characters in the method taught by Bancroft et al.

Regarding claims 2 and 4, Bancroft et al. teach where the storage DNA is human DNA (column 3, lines 4-17) and where the storage DNA is synthetic (column 5, lines 1-30).

Regarding claim 11, Bancroft et al. teach where plain text/image is encrypted in terms of DNA sequences using encryption key software (column 11, lines 24-46).

Regarding claim 12, Bancroft et al. teach where the encoded data is expressed in different fragments of DNA (column 4, lines 45-54; column 6, lines 30-42).

Regarding claim 13, Bancroft et al. teach using a DNA synthesizer (column 4, line 55- column 5, line 30).

Art Unit: 1631

Regarding claim 17, Bancroft et al. teach where the DNA is mixed with complex denatured DNA strands of human genomic DNA (column 2, lines 34-54; column 4, lines 1-14).

Regarding claims 18, 29, and 31, Bancroft et al. teach extracting the message (column 5, lines 35-54); using PCR to isolate and amplify the encrypted DNA strand (column 5, lines 35-54); sequencing the DNA strand (column 5, lines 35-54); and converting the DNA sequence using the encryption/decryption key (column 2, lines 34-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to increase the number of nucleotides in the DNA codes taught by Bancroft et al. in order to represent more characters in the extended ASCII character set. Bancroft et al. teaches that DNA codes may be used to represent ASCII characters. However, Bancroft et al. does not teach the technique of apply further nucleotides in order to increase the number of characters the DNA codes may represent. Ackley teaches that increasing the size of the code also increases the number of characters the code may represent. Thus, it would have been obvious to one of ordinary skill in the art to apply the technique of increasing the size of a code as taught by Ackley, to improve the method of Bancroft et al. for the predictable results of enabling the code to represent more characters of the extended ASCII character set.

This rejection was necessitated by amendment.

Withdrawn Rejections

7. Applicant's arguments, see page 8, filed June 18, 2007, with respect to claims 2, 14, 15, 17 and 18 have been fully considered and are persuasive. The rejections made under 35 U.S.C. §112 of the office action dated March 1, 2007 have been withdrawn.

8. Applicant's arguments and amendments, see pages 8 and 9, filed June 18, 2007, with respect to the rejection(s) of claim(s) 1-13, 15-18, 20, and 21 under 35 U.S.C. §102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection as necessitated by amendment is made in view of Bancroft et al. and Ackley.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1631

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Lin whose telephone number is (571) 272-2561.

The examiner can normally be reached on 10:00-6:30, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Majorie A. Moran can be reached at (571) 272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JL/

Application/Control Number: 10/812,839

Page 9

Art Unit: 1631

/Shubo (Joe) Zhou/

SHUBO (JOE) ZHOU, PH.D.
PRIMARY EXAMINER